

AMENDMENTS TO THE CLAIMS

Listing of claims:

This listing of claims replaces all prior versions of claims in the application.

1. (Currently Amended) A pedestrian navigation device for navigating the route of a pedestrian, comprising:

position information reception means for obtaining current position information;

position information analysis means for analyzing said current position information received by ~~the~~ said position information reception means and calculating ~~the~~ a current position ai;

map information storage means for storing map information;

central processing means for calculating current position display information, based on said current position ai calculated by said position information analysis means, and on said map information stored by said map information storage means; and,

display means for displaying said current position display information calculated by said central processing means; and characterized in that

said central processing means has pedestrian history information comprising a reference direction α indicating the direction of a past movement route and a reference distance β indicating a prescribed distance, takes the current position at the start of navigation to be reference point a_0 , and, upon receiving the current position a_i after a prescribed time from said

position information analysis means, calculates the distance La_{0ai} between said reference point a_0 and said current position a_i , and when

$$\beta > La_{0ai} \quad (1)$$

corrects said current position a_i in the direction of said reference direction α and calculates current position display information, but when

$$\beta \leq La_{0ai} \quad (2)$$

corrects said current position a_i in the direction of said reference direction α and calculates current position display information, and in addition takes the corrected position of said current position a_i to be the new reference point, and takes the direction from the previous reference point a_0 to the new reference point to be the new reference direction α .

2. (Currently Amended) A pedestrian navigation device for navigating the route of a pedestrian, comprising:

position information reception means for obtaining current position information;

position information analysis means for analyzing said current position information received by the said position information reception means and calculating the a current position a_i ;

map information storage means for storing map information;

central processing means for calculating current position display information, based on said current position ai calculated by said position information analysis means, and on said map information stored by said map information storage means; and,

display means for displaying said current position display information calculated by said central processing means; and characterized in that

said central processing means receives the current position ai from said position information analysis means at prescribed intervals, and when the absolute value of the difference between ~~the~~ a direction angle Ai from the preceding current position ai-1 to the present current position ai and ~~the~~ a reference angle A is such that

$$\alpha 0 \text{ (tolerance angle)} \geq |A - A_i| \quad (3)$$

calculates current position display information from said current position ai, and takes the direction angle Ai to be the new reference angle A.

3. (Currently Amended) A pedestrian navigation device for navigating the route of a pedestrian, comprising:

position information reception means for obtaining current position information;

position information analysis means for analyzing said current position information received by ~~the~~ said position information reception means and calculating ~~the~~ a current position ai;

map information storage means for storing map information;

central processing means for calculating current position display information, based on said current position a_i calculated by said position information analysis means, and on said map information stored by said map information storage means; and,

display means for displaying said current position display information calculated by said central processing means; and characterized in that

said central processing means takes the current position at the start of navigation to be the reference point a_0 , receives the current position a_i at prescribed intervals from said position information analysis means, calculates the distance La_{0ai} between said reference point a_0 and the current position a_i , and when

$$\beta \text{ (reference distance)} > La_{0ai} \quad (4)$$

calculates current position display information from said current position a_i , but when

$$\beta \text{ (reference distance)} \leq La_{0ai} \quad (5)$$

calculates current position display information from said current position a_i , and in addition takes said current position a_i to be the new reference point, and takes the direction from the previous reference point a_0 to the new reference point a_i to be the new reference direction α .

4. (Currently Amended) The pedestrian navigation device according to Claim 3, characterized in that said central processing means takes the current position at the start of navigation to be the reference point a_0 , receives the current position a_i at prescribed intervals

from said position information analysis means, calculates the distance La_{0ai} between said reference point a_0 and said current position a_i , and when

$$\beta \text{ (reference distance)} > La_{0ai} \quad (4)$$

calculates current position display information from said current position a_i , but when

$$\beta \text{ (reference distance)} \leq La_{0ai} \quad (5)$$

calculates current position display information from said current position a_i , and in addition takes ~~the~~ a current position a_1 ~~next~~ calculated after next to said reference point a_0 to be the new reference point, and takes the direction from the previous reference point a_0 to said current position a_i to be the new reference direction α .

5. (Currently Amended) A pedestrian navigation device for navigating the route of a pedestrian, comprising:

position information reception means for obtaining current position information;

position information analysis means for analyzing said current position information received by ~~the~~ said position information reception means and calculating ~~the~~ a current position a_i ;

map information storage means for storing map information;

central processing means for calculating current position display information, based on said current position a_i calculated by said position information analysis means, and on said map information stored by said map information storage means; and,

display means for displaying said current position display information calculated by said central processing means; and characterized in that

said central processing means has a reference direction α indicating the direction of a past movement route and a prescribed tolerance angle γ , takes the current position at the start of navigation to be reference point a_0 , and, upon receiving the current position a_i after a prescribed time from said position information analysis means, calculates the direction $a_0 \rightarrow a_i$ from said reference point a_0 to said current position a_i , and

(a) if the direction $a_0 \rightarrow a_i$ is outside the range of the tolerance angle γ from the reference direction α , uses current position display information calculated using said reference point a_0 without modification; but

(b) if the direction $a_0 \rightarrow a_i$ is within the range of the tolerance angle γ from the reference direction α , calculates current position display information using said current position a_i , and moreover takes ~~the~~ a corrected position of said current position a_i to be the new reference point, and takes the direction from the previous reference point a_0 to the new reference point a_i to be the new reference direction α .

6. (Currently Amended) A pedestrian navigation device for navigating the route of a pedestrian, comprising:

position information reception means for obtaining current position information;

position information analysis means for analyzing said current position information received by ~~the~~ said position information reception means and calculating ~~the~~ a current position ai;

map information storage means for storing map information;

central processing means for calculating current position display information, based on said current position ai calculated by said position information analysis means, and on said map information stored by said map information storage means;

display means for displaying said current position display information calculated by said central processing means; and,

direction measurement means for measuring the direction of advance; and characterized in that

said central processing means takes the current position at the start of navigation to be reference point a0, and upon receiving ~~the~~ a current position a1 after a prescribed time from said position information analysis means, corrects said current position a1 in said direction of advance measured by said direction measurement means and calculates current position display information, and in addition takes the corrected position of said current position a1 to be the new reference point.

7. (Currently Amended) A pedestrian navigation device for navigating the route of a pedestrian, comprising:

position information reception means for obtaining current position information;

position information analysis means for analyzing said current position information received by the said position information reception means and calculating the a current position ai;

map information storage means for storing map information;

central processing means for calculating current position display information, based on said current position ai calculated by said position information analysis means, and on said map information stored by said map information storage means;

display means for displaying said current position display information calculated by said central processing means; and,

direction measurement means for measuring the direction of advance; and characterized in that

said central processing means takes the current position at the start of navigation to be reference point a_0 , and upon receiving the current position a_i after a prescribed time from said position information analysis means, calculates the direction $a_0 \rightarrow a_i$ from said reference point a_0 to said current position a_i , and

(a) if the direction $a_0 \rightarrow a_i$ is outside the range of the a tolerance angle γ from said direction of advance measured by said direction measurement means, uses current position display information calculated using said reference point a_0 without modification; but

(b) if the direction $a_0 \rightarrow a_i$ is within the range of the tolerance angle γ from said direction of advance measured by said direction measurement means, calculates current position display information using said current position a_i , and in addition takes ~~the~~ a corrected position of said current position a_i to be the new reference point.

8. (Previously Presented) The pedestrian navigation device according to Claim 6, characterized in that said direction measurement means is an electronic compass.

9. (Previously Presented) The pedestrian navigation device according to Claim 6, characterized in that said direction measurement means is a gyrosensor.

10. (Previously Presented) The pedestrian navigation device according to Claim 1, characterized in that said position information reception means obtains current position information from a GPS (Global Positioning System).

11. (Cancelled)

12. (Previously Presented) The pedestrian navigation device according to Claim 7, characterized in that said direction measurement means is an electronic compass.

13. (Previously Presented) The pedestrian navigation device according to Claim 7, characterized in that said direction measurement means is a gyrosensor.

14. (Previously Presented) The pedestrian navigation device according to Claim 2, characterized in that said position information reception means obtains current position information from a GPS (Global Positioning System).

15. (Previously Presented) The pedestrian navigation device according to Claim 3, characterized in that said position information reception means obtains current position information from a GPS (Global Positioning System).

16. (Previously Presented) The pedestrian navigation device according to Claim 4, characterized in that said position information reception means obtains current position information from a GPS (Global Positioning System).

17. (Previously Presented) The pedestrian navigation device according to Claim 5, characterized in that said position information reception means obtains current position information from a GPS (Global Positioning System).

18. (Previously Presented) The pedestrian navigation device according to Claim 6, characterized in that said position information reception means obtains current position information from a GPS (Global Positioning System).

19. (Previously Presented) The pedestrian navigation device according to Claim 7, characterized in that said position information reception means obtains current position information from a GPS (Global Positioning System).

20-25. (Cancelled)

26. (New) A computer program product usable with a computer having a computer program embodied therein, said computer having a central processing means, said computer program when executed by said computer causes the computer to perform the steps of:

(A) obtaining current position information;

(B) analyzing said current position information received by said step (A) and calculating a current position ai;

(C) storing map information;

(D) calculating, by said central processing means, current position display information, based on said current position ai calculated by said step (B), and on said map information stored by said step (C); and,

(E) displaying said current position display information calculated by said central processing means; and characterized in that

said central processing means has pedestrian history information comprising a reference direction α indicating the direction of a past movement route and a reference distance β indicating a prescribed distance, takes the current position at the start of navigation to be reference point a_0 , and, upon receiving the current position a_i after a prescribed time from said position information analysis means, calculates the distance La_{0ai} between said reference point a_0 and said current position a_i , and when

$$\beta > La_{0ai} \quad (1)$$

corrects said current position a_i in the direction of said reference direction α and calculates current position display information, but when

$$\beta \leq La_{0ai} \quad (2)$$

corrects said current position a_i in the direction of said reference direction α and calculates current position display information, and in addition takes the corrected position of said current position a_i to be the new reference point, and takes the direction from the previous reference point a_0 to the new reference point to be the new reference direction α .

27. (New) A computer program product usable with a computer having a computer program embodied therein, said computer having a central processing means, said computer program when executed by said computer causes the computer to perform the steps of:

(A) obtaining current position information;

(B) analyzing said current position information received by said step (A) and calculating a current position a_i ;

(C) storing map information;

(D) calculating, by said central processing means, current position display information, based on said current position a_i calculated by said step (B), and on said map information stored by said step (C); and,

(E) displaying said current position display information calculated by said central processing means; and characterized in that

said central processing means receives the current position a_i at prescribed intervals, and when the absolute value of the difference between a direction angle A_i from the preceding current position a_{i-1} to the present current position a_i and a reference angle A is such that

$$\alpha_0 \text{ (tolerance angle)} \geq |A - A_i| \quad (3)$$

calculates current position display information from said current position a_i , and takes the direction angle A_i to be the new reference angle A .

28. (New) A computer program product usable with a computer having a computer program embodied therein, said computer having a central processing means, said computer program when executed by said computer causes the computer to perform the steps of:

(A) obtaining current position information;

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(B) analyzing said current position information received by said step (A) and calculating a current position a_i ;

(C) storing map information;

(D) calculating, by said central processing means, current position display information, based on said current position a_i calculated by said step (B), and on said map information stored by said step (C); and,

(E) displaying said current position display information calculated by said central processing means; and characterized in that

said central processing means takes the current position at the start of navigation to be the reference point a_0 , receives the current position a_i at prescribed intervals, calculates the distance La_{0ai} between said reference point a_0 and the current position a_i , and when

$$\beta (\text{reference distance}) > La_{0ai} \quad (4)$$

calculates current position display information from said current position a_i , but when

$$\beta (\text{reference distance}) \leq La_{0ai} \quad (5)$$

calculates current position display information from said current position a_i , and in addition takes said current position a_i to be the new reference point, and takes the direction from the previous reference point a_0 to the new reference point a_i to be the new reference direction α .

29. (New) The computer program product according to claim 28, characterized in that said central processing means takes the current position at the start of navigation to be the

reference point a_0 , receives the current position a_i at prescribed intervals, calculates the distance La_{0ai} between said reference point a_0 and said current position a_i , and when

$$\beta \text{ (reference distance)} > La_{0ai} \quad (4)$$

calculates current position display information from said current position a_i , but when

$$\beta \text{ (reference distance)} \leq La_{0ai} \quad (5)$$

calculates current position display information from said current position a_i , and in addition takes a current position a_1 calculated next to said reference point a_0 to be the new reference point, and takes the direction from the previous reference point a_0 to said current position a_i to be the new reference direction α .

30. (New) A computer program product usable with a computer having a computer program embodied therein, said computer having a central processing means, said computer program when executed by said computer causes the computer to perform the steps of:

(A) obtaining current position information;

(B) analyzing said current position information received by said step (A) and calculating a current position a_i ;

(C) storing map information;

(D) calculating, by said central processing means, current position display information, based on said current position a_i calculated by said step (B), and on said map information stored by said step (C); and,

(E) displaying said current position display information calculated by said central processing means; and characterized in that

said central processing means has a reference direction α indicating the direction of a past movement route and a prescribed tolerance angle γ , takes the current position at the start of navigation to be reference point a_0 , and, upon receiving the current position a_i after a prescribed time from said position information analysis means, calculates the direction $a_0 \rightarrow a_i$ from said reference point a_0 to said current position a_i , and

(a) if the direction $a_0 \rightarrow a_i$ is outside the range of the tolerance angle γ from the reference direction α , uses current position display information calculated using said reference point a_0 without modification; but

(b) if the direction $a_0 \rightarrow a_i$ is within the range of the tolerance angle γ from the reference direction α , calculates current position display information using said current position a_i , and moreover takes a corrected position of said current position a_i to be the new reference point, and takes the direction from the previous reference point a_0 to the new reference point a_i to be the new reference direction α .

31. (New) A computer program product usable with a computer having a computer program embodied therein, said computer having a central processing means, said computer program when executed by said computer causes the computer to perform the steps of:

(A) obtaining current position information;

(B) analyzing said current position information received by said step (A) and calculating a current position a_i ;

(C) storing map information;

(D) calculating, by said central processing means, current position display information, based on said current position a_i calculated by said step (B), and on said map information stored by said step (C);

(E) displaying said current position display information calculated by said central processing means; and,

(F) measuring the direction of advance; and characterized in that

said central processing means takes the current position at the start of navigation to be reference point a_0 , and upon receiving a current position a_1 after a prescribed time from said position information analysis means, corrects said current position a_1 in said direction of advance measured by said step (F) and calculates current position display information, and in addition takes the corrected position of said current position a_1 to be the new reference point.

32. (New) A computer program product usable with a computer having a computer program embodied therein, said computer having a central processing means, said computer program when executed by said computer causes the computer to perform the steps of:

(A) obtaining current position information;

(B) analyzing said current position information received by said step (A) and calculating a current position a_i ;

(C) storing map information;

(D) calculating, by said central processing means, current position display information, based on said current position a_i calculated by said step (B), and on said map information stored by said step (C);

(E) displaying said current position display information calculated by said central processing means; and,

(F) measuring the direction of advance; and characterized in that

said central processing means takes the current position at the start of navigation to be reference point a_0 , and upon receiving the current position a_i after a prescribed time from said position information analysis means, calculates the direction $a_0 \rightarrow a_i$ from said reference point a_0 to said current position a_i , and

(a) if the direction $a_0 \rightarrow a_i$ is outside the range of a tolerance angle γ from said direction of advance measured by said step (F), uses current position display information calculated using said reference point a_0 without modification; but

(b) if the direction $a_0 \rightarrow a_i$ is within the range of the tolerance angle γ from said direction of advance measured by said step (F), calculates current position display information using said current position a_i , and in addition takes a corrected position of said current position a_i to be the new reference point.